ENGINEERING EVALUATION
FREMONT UNION HIGH SCHOOL DISTRICT; PLANT 14819
APPLICATION 6110

BACKGROUND

The Fremont Union High School District has applied for a permit for a new natural gas-fired cogeneration plant (S-1) at the site of the Lynbrook High School in San Jose. S-1 will consist of a 108 hp rich-burn engine with catalytic converter and is intended to run continuously.

EMISSIONS

Annual Average Emissions:

Basis:
- 108 hp rated output
- 8,760 hr/yr operation
- Emission factors from catalyst manufacturer's data for this engine

NOx	0.15 g/hp-hr
CO	0.60 g/hp-hr
NMHC (as methane)	0.15 g/hp-hr (assume all POC)

- Emission factors from U.S EPA, Table 3.2-3 for 4-stroke, rich-burn, natural gas-fired engines (uncontrolled):

SO2	0.000588 lb/MM BTU
PM10	0.0095 lb/MM BTU

NOx (108 hp)(0.15 g/hp-hr)(8,760 hr/yr)(lb/454 g)/(365 day/yr)
0.86 lb/day

CO (108 hp)(0.60 g/hp-hr)(8,760 hr/yr)(lb/454 g)/(365 day/yr)
3.43 lb/day

POC (108 hp)(0.15 g/hp-hr)(8,760 hr/yr)(lb/454 g)/(365 day/yr)
0.86 lb/day

SO2 (0.945 MM BTU/hr)(0.000588 lb/MM BTU)(8,760 hr/yr)
/(365 day/yr) = **0.01 lb/day**

PM10 (0.945 MM BTU/hr)(0.0095 lb/MM BTU)(8,760 hr/yr)
/(365 day/yr) = **0.22 lb/day**

Daily Emissions:

Daily emissions are calculated to establish whether a source triggers the requirement for BACT (10 lb/highest day emissions for any class of pollutants). Since S-1 is assumed to run continuously, the daily emissions are equivalent to the annual average emissions, and BACT is not triggered for any pollutant.

PLANT CUMULATIVE INCREASE

	current (ton/yr)	proposed (lb/day)	proposed (ton/yr)	new total (ton/yr)
POC:	0	**0.86**	**0.16**	**0.16**
NO_x:	0	**0.86**	**0.16**	**0.16**
SO_2:	0	**0.01**	**negligible**	**negligible**
CO:	0	**3.43**	**0.63**	**0.63**
NPOC:	0	0	0	0
PM_{10}:	0	**0.22**	**0.04**	**0.04**

TOXIC RISK SCREENING ANALYSIS

Emission factors for toxic compounds are available from both U.S. EPA's AP-42 (Table 3.2-3), and from the CARB database of toxic emission factors. The EPA data is for large, natural gas pipeline drivers of various configurations, while CARB has data for small (<650 hp), rich-burn engines. Because the CARB data is more specific to the proposed engine, it will be used. A printout of the factors is attached. Most of these factors are "uncontrolled". However, for benzene and formaldehyde, factors are provided for engines controlled by NSCR. For these pollutants, the controlled factors will be used, since a catalyst is proposed for S-1. For other pollutants, a control efficiency of 80% is assumed. This factor is conservatively based on the demonstrated catalyst efficiency of 93.5% for non-methane hydrocarbons (NMHC) and 94% total hydrocarbons (see Johnson Matthey data sheet). Also, maximum, mean and median factors are provided by CARB for each pollutant. The mean factor is used in each case.

Toxic Pollutant Emitted	Emission Rate (lb/yr)	Risk Screening Trigger (lb/yr)
1,3-butadiene	0.164	1.1
acetaldehyde	1.39	72
acrolein	0.86	3.9
PAHs	0.018	0.044
naphthalene	0.12	270
toluene	1.69	39,000
xylene	0.095	58,000
formaldehyde	0.39	33
benzene	0.58	6.7

A toxic risk screening is not required because each compound is below its assigned risk screening trigger levels.

STATEMENT OF COMPLIANCE

S-1 is not subject to the emission rate limits or record keeping requirements of Regulation 9, Rule 8 ("NOx and CO from Stationary Internal Combustion Engines"), in accordance with the exemption in 9-8-110.1 for engines with an output rating less than 250 hp. Like all sources, S-1 is subject to Regulation 6 ("Particulate and Visible Emissions"). Because it uses natural gas fuel, S-1

is not expected to produce visible emissions or fallout in violation of this regulation and will be assumed to be in compliance with Regulation 6 pending a regular inspection.

This application is considered to be ministerial under the District's proposed CEQA guidelines (Regulation 2-1-311) and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Permit Handbook Chapter 2.3.

PSD, NSPS and NESHAPS are not triggered.

Regulation 2-1-412

Notification

The proposed engine will be located on the site of a public high school. Therefore, this application is subject to the public notification requirements of Regulation 2-1-412. These requirements apply to the parents of the students at this school, the parents of the students at any other school within 1/4 mile of the source, and all other addresses within 1,000 feet of the source.

Comments / Responses

BACT

BACT is not triggered because emissions of each pollutant are expected to be less than 10 lb/highest day.

OFFSETS

Offsets are not required because facility-wide POC and NO_X emissions are estimated to be less than 15 ton/yr (S-1 is the only permitted source at this facility).

PERMIT CONDITIONS

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1. The owner/operator of the S-1 cogeneration plant shall use only natural gas fuel for this source.
   [Cumulative Increase]

2. The owner/operator of the S-1 cogeneration plant may operate up to 8,760 hours per calendar year.
   [Cumulative Increase]

3. The owner/operator of the S-1 cogeneration plant shall maintain the catalytic converter used on the S-1 engine in

operation and in good operating condition whenever S-1 operates. [Cumulative Increase]

4. The owner/operator of the S-1 cogeneration plant shall maintain monthly records of the fuel consumption at S-1. These records shall be kept in a District-approved log for at least 2 years and shall be made available to the District upon request. [Cumulative Increase]

RECOMMENDATION

Waive Authority to Construct and issue Permit to Operate to the Fremont Union High School District for:

S-1 Cogeneration Plant: Tecogen CM-75, 75 kW output, General Motors 454 engine, natural gas fuel, 454 cubic inch displacement, 108 hp rated output, Johnson Matthey catalytic converter

By: _____

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